



PCT/AU00/01168

AU 00/1168  
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REC'D 31 OCT 2000	
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AUSTRALIA  
PATENTS ACT 1990

ORIGINAL  
COMPLETE SPECIFICATION.  
PETTY PATENT

Invention Title: FERRULE HOLDING DEVICE

Name of Applicant: VICTOR EMMANUEL CASSAR.

The following statement is a full description of this invention, including the best method of performing it known to me/us:

## A FERRULE LOCATING TOOL

The present invention relates generally to a ferrule locating tool such as that used to locate a ferrule in a pre-cast concrete panel or a "tilt panel".

Tilt panels are generally pre-cast in reinforced concrete using steel formwork. The tilt panels include a grid of ferrules cast within the panel to provide anchoring points at which the panel can be lifted, braced or fixed. Conventionally, the ferrules are each bolted to the formwork at their predetermined positions. The panels together with the ferrules and reinforcing steel are then cast within the formwork structure whilst the bolts hold the ferrules in position. Once the concrete has cured and the panel is to be released from the formwork the bolts are removed. This technique for locating the ferrules suffers from at least the following drawbacks:

- (i) the steel formwork requires drilling for each of the ferrules which is both time consuming and labour intensive; and
- (ii) each panel may have its own grid of ferrules which requires repeated drilling of the formwork for the specific ferrule locations.

According to one aspect of the present invention there is provided a ferrule locating tool for a concrete panel, said tool comprising:

- a base including one or more magnetic elements designed to releasably locate the base at a predetermined position on formwork on which the concrete panel is to be formed; and
- a locating member connected to the base and being adapted to removably receive a ferrule which is temporarily magnetically secured to the base.

According to another aspect of the invention there is provide a method of casting one or more ferrules in a concrete panel, said method comprising the steps of:

5 providing one or more ferrule locating tools each including a base connected to a locating member being adapted to removably received on of the ferrules;

locating the base at a predetermined position on formwork on which the concrete panel is to be formed;

10 magnetically securing the base to the formwork at the predetermined position; and

locating said one ferrule on the respective locating member and temporarily magnetically securing said ferrule to the base in preparation for casting the concrete panel.

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Preferably the base further includes one or more other magnetic elements being configured to effect the temporary magnetic securing of the ferrule to the base. More preferably said other magnetic elements are disposed about a periphery of the locating member.

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Typically the magnetic force exerted by said one or more magnetic elements is greater than that exerted by said one or more other magnetic elements. Thus, the ferrule locating tool is retained on the formwork when the cured concrete panel is lifted or otherwise released from the formwork.

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Generally said one or more magnetic elements are in the form of a circular or ring-shaped magnetic element located in a lower surface of the base whilst said one or more other magnetic elements are separate magnets positioned in an upper surface of the base adjacent the locating member. Alternatively the base is at least partly constructed of a magnetic material thereby forming said one or more magnetic elements and/or said one or more other magnetic elements.

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Typically the base is generally disc-shaped and the locating member is in the form of a pin or dowel connected coaxial with the base. More typically the pin is screw  
5 threaded to the base.

Preferably the pin is adapted to be slidably received within a threaded bore of the ferrule. More preferably the disc-shaped base includes a tapered peripheral wall  
10 which allows retraction of the tool from the cast concrete panel.

Typically said magnetic elements are formed of a relatively strong magnetic material such as an alloy of  
15 Neodymium, Iron and Boron.

Generally the concrete panel is a pre-cast concrete panel otherwise known in Australia as a "tilt panel".

20 In order to facilitate a better understanding of the nature of the present invention a preferred embodiment of a ferrule locating tool will now be described, by way of example only, with reference to the accompanying drawing in which:

25 Figure 1 is an elevational together with upper and lower views of a ferrule locating tool.

As shown in figure 1 there is a ferrule locating tool depicted generally as 10 comprising a base 12 and a  
30 locating member 14. The tool 10 of this embodiment includes a magnetic element 16 set within a lower surface of the base 12 and a pair of other magnetic elements 18A and 18B set in an upper surface of the base 12.

35 In this example the base 12 is disc-shaped having a tapered peripheral wall 20. The locating member 14 is in the form of a pin or dowel which is screw threaded via a

fastener (not shown) coaxial with the disc-shaped base 12. The diameter of the dowel 14 is such that it slidably receives a ferrule (not shown). However, it should be appreciated that the dowel 14 can be interchanged  
5 depending on the particular ferrule which it is to engage. The dowel 14 may include a ring-shaped or circular magnet (not shown) located adjacent its screw connection to the base 12. This may assist in magnetic retention of the ferrule to the locating tool 10. The dowel 14 at its  
10 upper end may also be shaped to receive a spanner or the like which facilitates unscrewing or tightening of the dowel 14 to the base 20.

In this embodiment the disc-shaped base 20 and dowel 14  
15 are machined from steel. The lower and upper magnets 16 and 18A/B are formed of a relatively strong magnetic material which in this example is an alloy of neodymium, iron and boron. The tool 10 is designed so that the magnetic force exerted by the lower magnet 16 is greater  
20 than that exerted by the upper magnets 18A/B. Furthermore, the disc-shaped base 12 is designed so that the magnetic field generated by the lower and upper magnets 16 and 18A/B is concentrated in close proximity to the base 12.

25

In order to assist in further understanding this embodiment of the invention, the general steps involved in locating a ferrule in a concrete panel such as a pre-cast tilt panel, using the described ferrule locating tool 10  
30 will now be outlined:

1. The disc-shaped base 20 is located on formwork, such as a steel sheet, at its required position;
- 35 2. The lower magnet 16 temporarily secures the tool 10 to the formwork;

3. The ferrule is slid over the dowel 14 of the tool 10;  
and

4. The upper magnets 18A/B temporarily magnetically  
5 secure the ferrule to the base 12 of the tool 10.

This procedure is repeated for each ferrule which is to be  
cast within the tilt panel of this example. In a  
conventional manner concrete is then poured onto the  
10 formwork to form the tilt panel in which the ferrules are  
embedded. The magnetic force exerted on the formwork by  
the lower magnet 16 is sufficient to securely hold the  
ferrule in position whilst the panel is poured and  
thereafter cures.

15

The relative strengths of the lower and upper magnets 16  
and 18A/B are such that upon lifting of the pre-cast tilt  
panel from the formwork, the various ferrules are released  
from the respective tool 10 whilst the tool 10 is securely  
20 retained on the formwork. The tapered peripheral wall 20  
of the base 12 of the tool 10 assists in release of the  
pre-cast tilt wall from the tool 10 without damaging the  
tilt panel. Advantageously, each of the ferrules are  
"automatically" released from the respective locating tool  
25 such as 10 upon lifting of the tilt panel. The threaded  
bore of the respective ferrule merely slides clear of the  
dowel 14 of the tool 10.

Now that a preferred embodiment of the invention has been  
30 described in some detail it will be apparent to those  
skilled in the art that the ferrule locating tool has at  
least the following advantages over the admitted art:

1. The locating tools can be located on the formwork  
35 panel relying on the magnetic attraction of the tool  
without the necessity for drilling holes for fixing  
of the tool;

2. The position of the locating tool can be adjusted merely by releasing the magnetic "clamp" between the base and the formwork without the need to drill additional holes;

3. The ferrule locating tool is relatively quick to locate and remains in position whilst the concrete panel is poured; and

4. The ferrule locating tool allows for "automatic" release of the ferrule whilst the tool is retained on the formwork.

It would be apparent to those skilled in the art that the invention described may include variations and modifications. For example, a portion of the base and/or locating member itself may be fabricated from a magnetic material which is effective in retaining the tool on the formwork and/or releasably holding the ferrule. Furthermore, the base and locating member may be formed integral with one another rather than in two components as described. The specific configuration of the locating tool may vary provided it can be magnetically secured to formwork and provide a locating member for the ferrule.

All such variations and modifications are to be considered within the scope of the present invention and nature of which to be determined from the foregoing description.

The claims defining the Invention are as follows:

1. A ferrule locating tool for a concrete panel, said tool comprising:

5 a base including one or more magnetic elements designed to releasably locate the base at a predetermined position on formwork on which the concrete panel is to be formed; and

10 a locating member connected to the base and being adapted to removably receive a ferrule which is temporarily magnetically secured to the base.

2. A ferrule locating tool as defined in claim 1 wherein the base further includes one or more other magnetic elements being configured to effect the temporary magnetic securing of the ferrule to the base.

15 3. A ferrule locating tool as defined in claim 2 wherein said one or more magnetic elements are in the form of a circular or ring-shaped magnetic element located in a lower surface of the base whilst said one or more other magnetic elements are separate magnets positioned in an  
20 upper surface of the base adjacent the locating member.

4. A ferrule locating tool as defined in claim any one of the proceeding claims wherein the base is generally disc-shaped and the locating member is in the form of a pin or dowel connected coaxial with the base.

25 5. A ferrule locating tool as defined in claim 4 wherein the pin is adapted to be slidably received within a threaded bore of the ferrule and the disc-shaped base includes a tapered peripheral wall which allows retraction of the tool from the cast concrete panel.

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Dated this 3rd day of May 2000

VICTOR EMMANUEL CASSAR

By their Patent Attorneys

GRIFFITH HACK

# ABSTRACT

The present invention relates generally to a ferrule  
5 locating tool (10) comprising a base (12) and a locating  
member (14). The tool (10) includes a magnetic element  
(16) set within a lower surface of the base (12) and a  
pair of other magnetic elements (18A and 18B) set in an  
upper surface of the base (12). The locating member (14)  
10 is in the form of a pin or dowel which is screw threaded  
via a fastener coaxial with the base (12) which is disc-  
shaped. The ferrule locating tool (10) is designed so  
that a ferrule of a tilt panel is slid over the dowel (14)  
of the tool (10). The lower magnet (16) of the tool (10)  
15 serves to temporarily secure the tool (10) to the formwork  
whilst the tilt panel is cast in concrete.

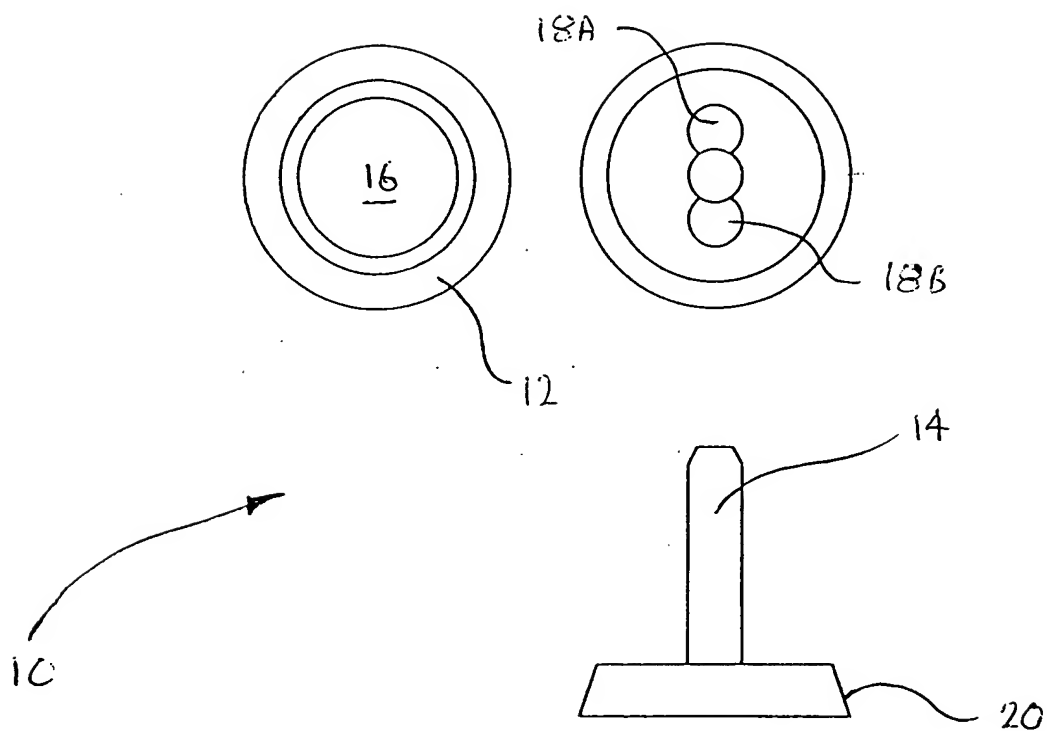


FIG. 1

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